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New Developments

Patenting nature or protecting culture? Ethnopharmacology and indigenous intellectual property rights

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ABSTRACT

Ethnopharmacologists are scientists and anthropologists that study indigenous medicines and healing practices, and who often develop new therapies and medicines for wider use. Ethnopharmacologists do fieldwork with indigenous peoples in traditional societies, where they encounter a wide range of cultural values and varying ideas about the nature of property relations. This poses difficulties for protecting indigenous intellectual property and for making just trade agreements. This Note reviews the legal issues relevant to the protection of indigenous resources in ethnopharmacology trade agreements, and suggests that recent developments in anthropology and the social study of science could be instructive in furthering the legal discourse and in providing policy directions. Specifically, the Note introduces the concepts of 'ontological pluralism' and 'epistemic subsidiarity', which could help lawmakers write *sui generis* trade agreements to better protect indigenous knowledge and resources.

KEYWORDS: Epistemological pluralism, Ethnopharmacology, indigenous rights, intellectual property rights, traditional ecological knowledge

INTRODUCTION

In 2012, the US Food and Drugs Administration approved a treatment for HIV-associated diarrhea that was derived from *Croton lechleri*, a flowering plant indigenous

to Peru.[1] The drug was developed on the back of research by ethnopharmacologists with indigenous Amazonian peoples.[2] The latex of *C. lechleri* was initially developed by Napo Pharmaceuticals, a re-incarnation of Shaman Pharmaceuticals, a now-defunct ethnopharmacology company that targeted Amazonian traditional medicines in the 1990s.[3] But before its identification by Napo, the viscous dark-red sap of *C. lechleri*, locally known as 'Dragon's blood', was used in traditional medicine as a cicatrizant, an anti-inflammatory, an anti-microbial, an anticancer agent, and for digestive disorders.[4] In providing reciprocal benefits back to the native community, Napo has been replanting deforested areas, and providing at-cost medication to the local people.[5] While these efforts are exemplary, drug development from indigenous knowledge raises the question as to what ought to be the gold standard for collaboration, and benefit sharing, with indigenous communities.

Previously, companies tended to compensate indigenous people for their role in the drug discovery process by according them a share of the profits from the drug once it had been commercialized. [6] But the long period of time needed for drug discovery and clinical trials, often ten years or more, was thought to render such a mechanism of reciprocity unsatisfactory for the contemporary holders of traditional ecological knowledge (TEK)[7] that help develop the drug.[8] Furthermore, in most cases, the knowledge shared would not lead to a commercial end product, so that when compensation was structured in this way, no benefit of any kind would ultimately accrue to the indigenous people.[9]

This Note introduces the field of ethnopharmacology, and outlines the difficulty of recognizing indigenous property and TEK in the development of drugs from traditional medicines. It reviews the international law pertaining to the protection of indigenous resources and highlights the shortcomings, principally the failure to adequately recognize shared indigenous resources on their own terms. It argues that the negotiation of international intellectual property rights (IPR) over traditional medicines necessitates 'symmetrical' negotiations with the communities from where the plants originate. This means recognizing, respecting, and responding to the local expressions of property values and autonomy, and engaging with local communities, their cosmologies, and their regimes of knowledge, on their particular terms. This might be better achieved with consideration of the emerging anthropological and legal concepts of 'ontological

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1 U.S. FDA, http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm333701.htm (accessed Jan. 3, 2016)

2 Kelly E. Lindner, *Blood of the Dragon: the Sustainable Harvest and Replanting of the Croton Lechleri Tree*, 84 Herbalgram 56 (2009).

3 *Id.*

4 Maria I. Lopes et al., *Mutagenic and Antioxidant Activities of Croton Lechleri Sap In Biological Systems*, 95 J. Ethnopharm. 437 (2004).

5 Lindner, *supra* note 2.

6 Donald E. Bierer et al., *Shaman Pharmaceuticals: Integrating Indigenous Knowledge, Tropical Medicinal Plants, Medicine, Modern Science and Reciprocity into a Novel Drug Discovery Approach*. Network Sci. http://www.netsci.org/Science/Special/feature11.html (accessed Mar. 12 2012).

7 Martha Johnson, lore (1992) defines TEK as 'knowledge built by a group of people through generations living in close contact with nature.'

8 Bierer et al., *supra* note 6.

9 *Id.*

pluralism'[10] and 'epistemic subsidiarity',[11] which are introduced here. Finally, it is suggested that these concepts could help yield better policy solutions and help write *sui generis* IPR laws[12] and trade agreements for this context.

ETHNOPHARMACOLOGY

Ethnopharmacologists study indigenous medicines and healing practices, and with the insights gained, sometimes develop new therapies and medicines for wider use. Ethnopharmacologists often do fieldwork with traditional societies, thus, encountering a wide range of cultural values and varying property relations during their investigations.[13] Successful drugs developed from natural products include taxol, quinine, ephedrine, and digoxin.[14] However, ethnopharmacologists also face local 'ontological conflicts' in the field. Indigenous claims defining the fundamental nature of the medicines being studied may clash incommensurably with scientific and pharmaceutical reasoning.[15] Divergent assumptions of what nature is are put in contest, thereby problematizing normative Western measures of intellectual property.[16]

Even more profound ethical questions arise when ethnopharmacologists patent or genetically engineer plants that are sacred to indigenous people. Who owns nature? And to whom should profits from drugs developed be directed?[17] Recent examples of such conflicts include the patenting of the wild rice of the indigenous American Ojibwe,[18] or the patenting of a Maize crop,[19] which affected indigenous Mexicans. When indigenous worldviews and interests are deemed to be inadequately considered, claims of 'biocolonialism' may be made, even if applicable legal procedures are followed diligently.[20]

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[10] Mario Blaser, *Ontological Conflicts and the Stories of Peoples in Spite of Europe: Toward a Conversation on Political Ontology*, 54 CURR. ANTHROPOL. 547, 568 (2013); PHILIPPE DESCOLA, BEYOND NATURE AND CULTURE (2013); BRUNO LATOUR, AN INQUIRY INTO MODES OF EXISTENCE (2013).

[11] Sheila Jasanoff, *Epistemic Subsidiarity–Coexistence, Cosmopolitanism, Constitutionalism*, 2 EUR. J. RISK REGUL. 133, 141 (2013).

[12] On '*sui generis*' law see Karin Timmermans, *Intellectual Property Rights and Traditional Medicine: Policy Dilemmas at the Interface*, 57 SOC. SCI. MED. 745, 751 (2003).

[13] Ian V. McGonigle, *Spirits and Molecules: Ethnopharmacology and Symmetrical Epistemological Pluralism*, ETHNOS. (Forthcoming)

[14] Taxol, or *Paclitaxel*, is a microtubule-targeting—anti-mitotic— compound that was developed following its isolation from the bark of the Pacific Yew tree (*Taxus brevifolia*) in the USA, and is mostly used to treat post-operative lung, ovarian, and breast cancer. For a history of the development of Taxol. See JORDAN GOODMAN & VIVIEN WALSH, THE STORY OF TAXOL (2006). Quinine is a compound that is found in the bark of Cinchona trees. Quinine was originally used by the Quechua of Peru and Bolivia, and was brought from South America to Europe by Jesuit missionaries. Quinine was widely used to treat malaria in West, until its replacement with synthetic analogs in the 1940s. Ephedrine is an extract of the *Ephedra distachia* plant, which has been used in China for millennia to treat respiratory conditions. Since its isolation in the late 19th century, ephedrine has been used in the West as a stimulant and to treat hypotension and congestion. Digoxin, which was identified as a cure for bovine congestive heart failure in the late eighteenth century in Britain, is the extract from the foxglove plant (*Digitalis lanata*), digoxin and its analogs, which have has since been used to treat heart failure and arrhythmic heart conditions.

[15] McGonigle, *supra* note 13, at 17.

[16] *Id.*

[17] Mascha Gugganig, *The Ethics of Patenting and Genetically Engineering the Relative Hāloa*, ETHNOS 1 (Forthcoming).

[18] WINONA LADUKE, RECOVERING THE SACRED (2005).

[19] ELIZABETH FITTING, THE STRUGGLE FOR MAIZE (2011).

[20] Laurie A. Whitt, *Biocolonialism and the Commodification of Knowledge*, 7 SCI. CULT. 33 (1998).

The University of Hawai'i, for example, recently patented a genetically engineered version of Taro, a Hawaiian indigenous plant. This caused a controversy[21] in Hawai'i because the plant features as an agent in the indigenous 'cosmogenic creation story, the Kumulipo'.[22] The Kumulipo story describes indigenous kinship to 'taro, as elder brother and ancestor Hāloa'.[23] After several petitions and protests by farmers, activists, and community members, the University of Hawai'i eventually dropped their patents to Taro.[24]

There were several issues at play in this particular case. Patent law, whose purpose is to reward inventors for their creative works and protect the rights of individual bearers of property, was applied to afford rights to the scientists that engineered a genetically modified version of Taro, even though, naturally-occurring Taro can be viewed as more of a community resource. In this case it appears that patent law was in conflict with protecting the collective rights of indigenous groups. This creates a need for *sui generis* IPR for protecting indigenous shared resources.[25] Further, in the case of Taro, the indigenous definitions of the plant (genetically engineered or not) fell outside of normative Western definitions of property.

Similar issues arise in other locations. With indigenous groups in South America, for example, attention must be paid to the 'spirits' or 'earth beings' that are essential actors in local discourses. In the Peruvian Andes, such spirit beings are 'contentious because their presence in politics disavows the separation between 'Nature' and 'Humanity". This fact poses a challenge for Western legal discourses in which spirits do not partake.[26] However, no US jurisdiction has yet enacted any special legislation governing 'bioprospecting'.[27]

Though the ethnopharmacology community has amply debated and discussed the issue of the protection of indigenous intellectual property, and has established guidelines for just exchange agreements with native communities,[28] this debate has yet to incorporate the underlying issues of whose knowledge and claims are trusted, and what kinds of expert knowledge should prevail in making trade agreements (be they Western

[21] Gregory K. Schlais, *The Patenting of Sacred Biological Resources, the Taro Patent Controversy in Hawai'i: A Soft Law Proposal*, 29 U. HAW. L. REV. 581 (2007).

[22] Gugganig, *supra* note 17, at 2.

[23] *Id.*

[24] Susan Essoyan, *Activists Tear Up 3 UH Patents for Taro*, HONOLULU STAR-BULL, June 21, 2006, http://archives.starbulletin.com/2006/06/21/news/story03.html

[25] Schlais, *supra* note 21, at 583, citing Donna Craig, *Biological Resources, Intellectual Property Rights and International Human Rights: Impacts on Indigenous and Local Communities*, in INTELLECTUAL PROPERTY AND BIOLOGICAL RESOURCES (Burton Ong ed., 2005) ('In IP law, developing a *sui generis* IPR is developing an alternative IPR that is governed by fundamentally different principles and modes of protection. A *sui generis* system can be a whole new IPR, modification of existing IPR, or a completely new IPR right . . . . In 2000, Panama passed Law No. 20, the first sui generis indigenous IPR in the world. This law grants to Panama's indigenous groups the "exclusive, collective and perpetual rights to their creations, inventions and traditional expressions".')(internal citations omitted).

[26] Marisol De La Cadena, *Indigenous Cosmopolitics in the Andes: Conceptual Reflections Beyond 'Politics'*, 25 CUL. ANTHROPOL. 334, 342 (Burton Ong ed., 2004).

[27] Catharine Lo, *Patents on Life: The World in Whose Hands?* HONOLULU WEEKLY, Apr. 5, 2006, at 8.

[28] Michael R. Boyd, *The Position of Intellectual Property Rights in Drug Discovery and Development from Natural Products*, 51 J. ETHNOPHARM. 17, 25 (1996); R. Calle, *Juridical and Sociocultural Problems on the Definition of a A Law Concerning Property, Usage And Access to Genetic Resources in Colombia*, 51 J. ETHNOPHARM. 127, 142 (1996); Djaja D. Soejarto et al., *The UIC ICBG (University of Illinois at Chicago International Cooperative Biodiversity Group) Memorandum of Agreement*, 67 J. NAT PROD. 294, 299 (2004).

scientific, local indigenous, or a hybrid compromise version). Moreover, it is now clear that the Convention on Biological Diversity[29] (CBD), the main international treaty that has established the legal framework for the protection of the indigenous intellectual property, and follow-up international agreements,[30] have not yet yielded the intended results of giving satisfactory 'scientific value' or protection to local resources, nor bringing adequate benefits to indigenous communities.[31] The CBD signatories grant access to natural resources to the biodiversity in their territories, based on 'reasonable' terms,[32] but the outputs from biotechnology and industrial development are generally considered private property, allowing local stakeholders to be cut off from the downstream benefits.

THE GLOBAL LEGAL CONTEXT

According to the World Health Organization's estimate, approximately 85 per cent of the people on the planet still depend on plants for their primary health care.[33] Moreover, the traditional medicine industry that markets natural products and over-the-counter herbal remedies in developed countries is an attractive market sector for pharmaceutical companies and savvy entrepreneurs. It is now estimated to be worth over $60 billion.[34] But international law provides poor resources for the protection of claims to the exclusivity of indigenous TEK and ethnomedical knowledge. Most of the current international law affecting indigenous knowledge and intellectual property was produced as a consequence of the CBD, which was enacted following the Rio de Janeiro Earth Summit in 1992, and has since been signed by almost 200 countries—though not the USA—making it one of the world's most subscribed to international treaties in history.[35] The three core goals of the convention were the conservation of biological diversity, the sustainable use of resources, and fair and equitable sharing of benefits. The main outcome of this agreement has been the regulation of 'genetic resources'[36] and the establishment of benefit-sharing provisions across the globe. Since the CBD was promulgated, a further host of trade-related IPR agreements (TRIPs) were signed.[37] The TRIPs agreements, initially negotiated at the General Agreement on Tariffs and Trade in 1994, were conceived as an expansion of the CBD, clarifying the minimum standards for regulating IPR for World Trade Organization (WTO) member states.[38]

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[29] Convention on Biological Diversity, https://www.cbd.int (accessed Nov. 6, 2015).

[30] See e.g. United Nations, *Cartagena Protocol on Biosafety to the Convention on Biological Diversity* (2000); United Nations, *Declaration on the Rights of Indigenous Peoples* (2008); and Nagoya Protocol on Access to Genetic Resources (2010).

[31] Michael Heinrich et al., *A Perspective on Natural Products Research and Ethnopharmacology in Mexico*, 77 J. NAT. PROD. 678, 686 (2014).

[32] K. McAfee, *Neoliberalism on the Molecular Scale. Economic and Genetic Reductionism in Biotechnology Battles*, 34 GEOFORUM 203, 211 (2003); CBD, *CBD Preamble and Article 15*, https://www.cbd.int (accessed Nov. 6, 2015).

[33] WHO, Fact Sheet No. 271 (2002).

[34] WHO, *General Guidelines For Methodologies on Research And Evaluation of Traditional Medicine* (2000).

[35] Convention on Biological Diversity, *List of Parties*, https://www.cbd.int/information/parties.shtml (accessed Dec. 6, 2015).

[36] 'Genetic resources' include material of plant, animal, microbial, or other biological origin.

[37] World Trade Organization, *TRIPS: Agreement on Trade-Related Aspects of Intellectual Property Rights, Preamble*, https://www.wto.org/english/tratop_e/trips_e/t_agm1_e.htm (accessed Dec. 6, 2015).

[38] *Id.*

For ethnopharmacology researchers, the overall consequences of these treaties are the nationalization of TEK and a country-by-country regulation of the flow of traditional knowledge—including genetic resources such as bioactive plants and their extracts—out of countries in the global South.[39] However, current international IPR law allows researchers and companies to claim IPR, such as patents, over biological resources, and/or traditional knowledge even if they have been only 'slightly modified' from their initial forms.[40] Furthermore, 'TRIPs treats the genetic components of organisms, as well as genetically altered varieties of living organisms, as ordinary commodities subject to private ownership and standardized rules of transnational commerce'.[41] Most salient is the fact that pursuant to the CBD, so-called genetic resources are 'nationalized', and inscribed as the sovereign property of states, so individual countries retain legal and territorial control over biological resources and indigenous knowledge located within their borders.[42] For many of the traditional societies of the global South, however, this legal claim may be considered to be enacting 'econocolonialism', a position at odds with local ideas of 'nature', specific local 'ontologies', or many indigenous peoples' belief that plants are 'imbued with the power of God', or local spirits.[43] As such, indigenous people may believe these entities to be beyond the territory of the state and not for sale on the global market.[44]

INDIGENOUS RIGHTS

In the 1990s, activists responded to the work of corporations negotiating trade contracts for access to the biological resources of developing countries using the term 'biopiracy' to describe the illegitimately deemed, and sometimes illegal, resource extraction that such companies engaged in.[45] Since the 1990s, commercial drug development from natural products has subsided significantly. Today most ethnopharmacology research is conducted within academic institutions.[46] For practicing ethnopharmacologists, sufficient modifications of a plant substance or traditional therapy for legal proprietorship are rather simple. This may be as little as an alteration to the chemical structure of the active compound of a medicine, a small inventive step, or the use of a semisynthetic chemical analog, a slightly modified version of the original compound.[47]

Perhaps, the most notable example of this kind of proprietorial move occurred in the case of the indigenous peasant farmers of rural Mexico (Oaxaca), who cultivated

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39 McAfee, *supra* note 32, at 219.

40 M. Kartal, *Intellectual Property Protection in the Natural Product Drug Discovery, Traditional Herbal Medicine and Herbal Medicinal Products*, 21 Phytother. Res. 113, 116 (2007).

41 McAfee, *supra* note 32, at 210.

42 Carl Thornström, *International Conventions and Agreements*, in Beneficial Microorganisms In Agriculture, Food And The Environment 295 (Ingvar Sundh et al. eds, 2012).

43 Paul A. Cox, *The Seven Pillars of Ethnomedical Wisdom*, 17 Ethnobotany 24, 32 (2005).

44 *Id.*

45 For a history of the 'bio-prospecting' and privatization of indigenous drug candidates in Mexico: see Cori Hayden, When Nature Goes Public (2003).

46 McGonigle, *supra* note 13, at 21 ('with recent advances in technical capabilities, including genetic-, protein-, and antibody-engineering, more of the world's pharmaceutical development is now steering its focus towards the so-called class of 'biopharmaceuticals': drugs originating from rational design, genetic engineering, and biotechnological processes. Another reason for the recent decline of commercial interest in natural products is the uncertainty of success in natural product screens.').

47 Kartal, *supra* note 40 at 114.

barbasco yams and sold them for use in the burgeoning Mexican pharmaceutical industry.[48] The barbasco yam (*Dioscorea mexicana*), also simply called the Mexican yam, produces the steroid compound diosgenin, which is a precursor for the synthesis of the female sex hormone, progesterone. These yams were instrumental in the development of the female contraceptive pill during the 1970s and 1980s. Peasants' expert ecological know-how became publicly recognized through their central role in the bioscience development of Mexico, but in the 1990s, developments in synthetic chemistry made the wild yams redundant as a source, cutting out the peasants from the commercial networks and eliminating their role in the industry altogether.[49] In this case, the drug product that the indigenous peasant farmers helped to produce ultimately led to their exclusion from downstream benefits. Rather than affording protection to indigenous knowledge and contribution, the law allows companies to cut off any rights of the bearers of the indigenous knowledge that initially made the development possible. The current international regime favors the interests of commercial parties that can develop a synthetic alternative.

JUST TRADE AGREEMENTS

Shaman Pharmaceuticals, a US-based drug discovery firm that specifically targeted Amazonian traditional medicines, has considered the problem of the exploitation of indigenous TEK.[50] Throughout the 1990s, the company attempted to implement so-called 'just trade agreements' with indigenous Amazonian people.[51] Shaman Pharmaceuticals made efforts to provide benefits in staggered installments: short term benefits may include pharmaceutical and medical supplies for the indigenous people; medium term benefits include funding or providing programs of education; and long-term benefits would include a share in the profits from successful drug candidates.[52]

Such conscientious trade agreements as Shaman Pharmaceuticals attempted to establish, even if implemented successfully, still raise the ethical question of how to derive the final economic value of indigenous knowledge. If a profit-generating pharmaceutical were to be developed on the basis of indigenous knowledge shared, how much of the proceeds would be returned to the native community? What would be the ultimate remuneration for a medicine developed? At what point in the future would the debt to the indigenous people be considered paid? And who in the indigenous community would be selected to redistribute rewards? These questions address both the 'nature of proprietorship', and indeed the 'proprietorship of nature', highlighting the complex bundles of rights and regimes of reciprocity at stake in global trade. Furthermore, even a carefully considered but drawn out, or deferred, reward process, which can strengthen ties between agents, and the regimes of valuation that these ties carry, may indirectly institute a modernizing project atop a naïve, perhaps pre-capitalist, terrain. In response to such unwarranted potentials, anthropologist Arturo Escobar[53] suggests that the

[48] Gabriela S. Laveaga, Jungle Laboratories (2009).

[49] *Id.*

[50] Bierer et al., *supra* note 6; Steven R. King et al., *Biological Diversity, Indigenous Knowledge, Drug Discovery and Intellectual Property Rights: Creating Reciprocity and Maintaining Relationships*, 51 J. Ethnopharm. 45, 57 (1996).

[51] Bierer et al., *supra* note 6.

[52] *Id.*

[53] Arturo Escobar, *Whose Knowledge, Whose nature? Biodiversity, Conservation, and the Political Ecology of Social Movements*, 5 J. Pol. Ecol. 53, 58 (1998).

long-term fate and effect of these approaches is far from clear, and they do not address the 'contradictions of creating this type of hybrid nature', by which he means 'capitalist' and 'non-capitalist' nature, their divergent attitudes towards science and technology, as well as their inherently different assumptions about property and world heritage.

In an effort to minimize ethical pitfalls in regard to exchange agreements and exploitation in ethnopharmacology research, American biologist and anthropologist Darrell Posey argued strongly during the 1980s and 1990s that in dealing with indigenous peoples and making IPR agreements, 'all the steps must be led by indigenous people themselves'.[54] Posey argued that in relation to indigenous knowledge, IPR should not simply reduce TEK to a Western legal conceptual framework.[55] Recent developments in anthropology and the social study of science, however, could help bring such policy solutions to these issues.

ONTOLOGICAL PLURALISM AND EPISTEMIC SUBSIDIARITY

Sociocultural anthropologists are now vigorously questioning the adequacy with which descriptions of cultural difference—that is to say representational difference, or relativism—can explain the ways people inhabit different worlds.[56] Taking indigenous worlds seriously necessitates recognizing that indigenous people may be living in different schemes of reality, or 'ontologies',[57] which can consequently escape normative Western legal reasoning. Plant spirits, for example, which feature as central agents in Amazonian Shamanism, cannot easily be recognized by ethnopharmacologists, who favor a molecular understanding of plants and healing.[58] The analytic and ethical strength of the openness to 'ontological pluralism' inheres in its decisive displacement of 'culture' as a representational semiotic, and the treatment of indigenous worlds and worldviews with relative equality. Anthropologist Philippe Descola recently elaborated on the challenge of seeing and understanding Achuar (an indigenous Amazonian people) worlds:

> For, most often, peoples will not see the "same things" in their environment because the ontological furniture of their worlds will be composed of very different 'things.' An Achuar hunter cannot see a quark because a quark does not exist as a "thing" in the natural environment of anyone and is only detectable as an indirect clue thanks to highly complex machinery. It does not mean that the quark does not 'exist'; it means that its ontic mode of existence is dependent upon its epistemic mode of existence, and that it thus cannot exist in the ontological furniture that composes the world of an Achuar. Conversely, it is doubtful that a physicist working at the CERN Large Hadron Collider near Geneva will be able to see an Iwianch—an Achuar spirit of the dead—because an Iwianch does no more exist as a 'thing' in the environment than a quark does; it, too, is only detectable as a trace, and by the means of a complex set of phenomenological clues that will enable a person who has been trained to identify them to infer its presence. It does not mean

[54] Darrell A. Posey, *International Agreements and Intellectual Property Right Protection for Indigenous Peoples*. In Intellectual Property Rights for Indigenous Peoples: a Source Book, 223, 252 (Tom Greaves, ed. 1994).

[55] Darrell A. Posey, *Safeguarding Traditional Resource Rights of Indigenous People*. In Ethnoecology: Situated Knowledge/Located Lives 217, 230 (V.D. Nazarea, ed. 1999).

[56] Blaser, *supra* note 10; Descola, *supra* note 10; Latour, *supra* note 10.

[57] Descola, *supra* note 10.

[58] McGonigle, *supra* note 13, at 12.

> that an Achuar, properly trained in physics, would not be able to "see" a quark; or that a physicist, after spending a few years living with the Achuar, would not be able to detect the presence of an Iwianch. It only means that, in normal circumstances, the Achuar and the physicist live in worlds that are different because they are peopled by different beings whose existence is predicated upon different ontological premises.[59]

Ontological pluralism means taking seriously the visions and claims that sustain indigenous worlds, even if they conflict with normative assumptions and understandings. For anthropology, this involves the consideration of local ethnographic facts with parity to scientific facts. In taking equally seriously, the ontological status (culturally mediated existence) of indigenous plant spirits and local imaginations of nature, parties will face the challenge of incorporating ambiguous entities in their trade agreements. This entails the proposition of engaging in 'symmetrical' exchanges[60] with non-modern cosmologies and their various way of knowing nature, affording local entities legal status of protection. Such a prospect of adopting 'ontological pluralism', that is seeing things through native eyes, and deciding what exists based on local understanding, in relation to protecting indigenous intellectual property also necessitates a re-thinking of the effectiveness of IPR and their ability to recognize and protect non-Western phenomena.

In response to these shortcomings, emerging insights from social studies of science may also help in thinking about the ethical problems, legal structures, and cultural clashes that anthropologists engaging in ethnopharmacology research may face. Such scholarship may also offer insight for informing policy solutions and establishing better exchange agreements. Jasanoff,[61] for example, has theorized a legal framework for resolving ontological disputes in relation to varying definitions of nature. In a discussion of transnational risk governance, she develops the idiom of 'epistemic subsidiarity' to describe a formalized legal strategy that could pave the way to 'to protect spaces for the expression of local values and local autonomy', and therefore also protect the legitimacy of local modes of reasoning, within the same judicial system. 'Epistemic subsidiarity' is particularly salient to cross-border disputes where cosmopolitan exchanges require a formal system of reciprocity, compromise, and mutual respect of each party's respective regimes of knowledge and value. For ethnopharmacology, implementing 'epistemic subsidiarity' might mean the establishment of special courts that would consider indigenous claims on their own terms. With the expert mediation by anthropologists, cultural diplomats, or leaders from different parties who can mediate between secular technoscience and indigenous culture, such courts could be a space where indigenous definitions of nature and property are heard in parallel to the interests of other parties, be they states, companies, or researchers. Further, special laws could be written that would extend the protection of indigenous intellectual property to include non-modern understandings, including ambiguous spirit entities, or acquired TEK. A system of epistemic subsidiarity also requires political decisions be made at the 'lowest feasible level of governance' so that local values and concerns are first taken into account.[62] With epistemic subsidiarity, different knowledge regimes can exist side by side

[59] Philippe Descola, *The Difficult Art Of Composing Worlds (And Of Replying To Objections)*, 4 HAU 431, 433 (2014).

[60] McGonigle, *supra* note 13, at 18.

[61] Jasanoff, *supra* note 11 at 135.

[62] *Id.*

(such as, for example, biology, international law, state law, and local indigenous law and healing practices), without one necessarily subordinating to another. Epistemic subsidiarity could also facilitate the writing of trade agreements on local indigenous terms, while also recognizing international law and other parties' interests. Combining epistemic subsidiarity with the emerging anthropological perspectives that regard indigenous visions of their world with parallel ontological status to Western science could deliver 'symmetry' in the negotiation of trade agreements, and consequently, could help resolve the ethical dilemmas of ethnopharmacologists and indigenous peoples.

CONCLUSION

Stories like that of the Mexican peasants and their redundancy from the industry due to shortcuts made by chemistry in conjunction with IPR, or indeed the recent case of the Peruvian people who helped Napo develop 'Dragon's blood,' show that IPR are not adequate instruments for representing or protecting indigenous TEK and their embodied know-how. Moreover, current laws do not afford equal status to, or demand a symmetrical engagement with, non-modern cultural values and ambiguous local entities. Further, most discourse within the ethnopharmacology community is oriented to the biological and pharmacological sciences, with much less attention paid to the broader social, political, and anthropological dimensions of the research.[63] Consequently, the ethnopharmacology community has not yet addressed these questions with sustained debate, nor has there been much done to envision an ethical platform upon which to establish exchange agreements that incorporate 'non-modern' visions of the world.

Indigenous communities therefore need *sui generis* laws to protect their shared cultural heritage and shared natural resources. So far, 'Brazil, Costa Rica, India, Peru, Panama, the Philippines, Portugal, Thailand and the USA have all adopted *sui generis* laws that protect at least some aspects of traditional knowledge'.[64] But extending the concepts of ontological pluralism and epistemic subsidiarity into indigenous IPR laws could help lawmakers resolve the ethical and legal dilemmas over whose knowledge, and definitions of property, should prevail in exchange agreements and legal disputes.

While it is unlikely that the concepts of ontological pluralism and epistemic subsidiarity will lead to an immediate or perfect solution in all cases, this Note nonetheless proposes that these concepts could be helpful in beginning to write laws that render a more equal status to entities that normally escape Western understandings of nature. Such a move would require wider recognition that 'nature' is not universal or unequivocal, and that the many peoples on this planet engage in very different forms of reasoning and prioritization with regard to the resources at their disposal. Epistemic subsidiarity and ontological pluralism could thus be effective concepts when thinking through ontological conflicts in ethnopharmacology, and consequently, could deliver more just solutions.

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63 Victoria Reyes-García, *The Relevance Of Traditional Knowledge Systems For Ethnopharmacological Research: Theoretical And Methodological Contributions*, 6 J. ETHNOBIOL. ETHNOMED. 2 (2010).

64 Kartal, *supra* note 40 at 114, citing World Intellectual Property Organization, *Intellectual Property and Traditional* Knowledge, WIPO Publication No. 920. Booklet No. 2 (2005).